

## ASSESSMENT OF SEAM PUCKERING ON DIFFERENT TYPES OF FABRIC

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### ABSTRACT

*Seam puckering is the major issue that causes manufacturing defect in the appearance of clothing. There are various fabric used in clothing industry. Seam puckering is more common on woven fabrics than knits; and it is prominent on tightly woven fabrics. Therefore, in the present research, different fabrics like cotton, silk, chiffon, georgette were chosen along with a three-ply polyester filament sewing thread. Samples were sewn using 2 layers of fabric on single needle lock stitch sewing machine (301stitch). There are various factors that influence the seam quality which includes thread tension, stitch length, pressure, needle size and fabric feeding.*

**KEYWORDS:** Seam, Stitch, Puckering, Quality, Tension

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### INTRODUCTION

Seam puckering refers to the gathering of a seam during sewing, after sewing, or after laundering, causing an unacceptable seam appearance. Seam puckering is more common on woven fabrics than knits; and it is prominent on tightly woven fabrics (A & E, 2010). Seam puckering can be classified into three types

- Displacement pucker
- Relaxation pucker
- Transportation pucker

#### Displacement Pucker

It is caused by the insertion of sewing thread in the fabric. When needle thread enters the fabric, it tries to displace the yarns near the stitch hole. This results in a tension and leads to puckering.

#### Relaxation Pucker

The sewing thread that has been inserted with high tension will pucker after sewing (in many cases, it may take many hours). When thread, due to high machine thread tension, get elongated or stretched, as the stitch is being set, the thread in seam tries to recover or return to its original length. It also happens there is significant change in temperature and humidity during the sewing operation. Relaxation pucker becomes prominent when fabrics having dissimilar shrinkage characteristics are stitched together.

#### Transportation Pucker

This type of puckering occurs as a result of different friction conditions during transport of the fabric during stitching. The transport puckering occurs under the following conditions. During stitching of the fabric, bottom layers of the fabric moves forward with the movement of feed dog and due to friction between two layers

of fabric, bottom layer of fabric tries to take top layer of the fabric along with it. But top layer of fabric is held against the stationary pressure foot, which impedes the forward movement of the top layer. In the way layers of fabric move one over the other because of the different frictional resistance between the two layers of fabric themselves and on the other hand between upper layer of fabric and the stationary pressure foot. Hence the bottom layer of fabric resting on feed dog moves little faster than the top layer, which causes puckering (Rao,2006).

## METHODOLOGY

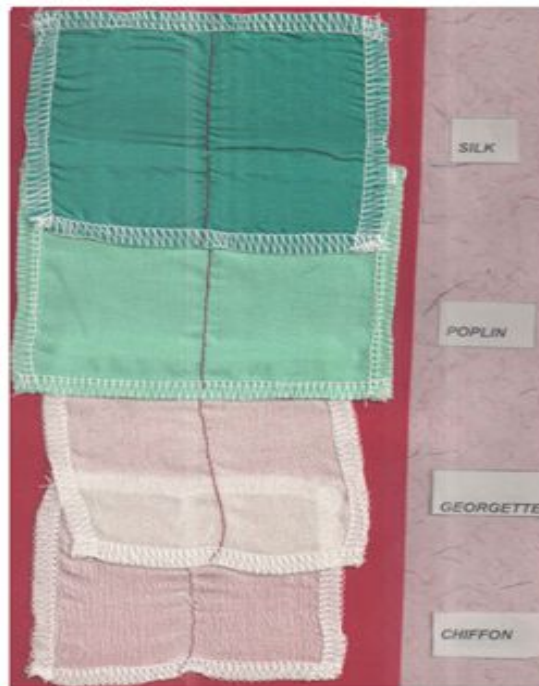
In the present research, different fabrics such as cotton (poplin – 40's), silk, chiffon, and georgette were chosen along with a three-ply polyester filament sewing thread. Samples were sewn using 2 layers of fabric on single needle lock stitch sewing machine (301stitch).

## RESULTS AND DISCUSSIONS

There are various factors that influence the seam quality and causes seam pucker.

- Upper thread and lower thread tension
- Incorrect pressure
- Stitch length
- Needle – Damaged and incorrect size
- Operator negligence

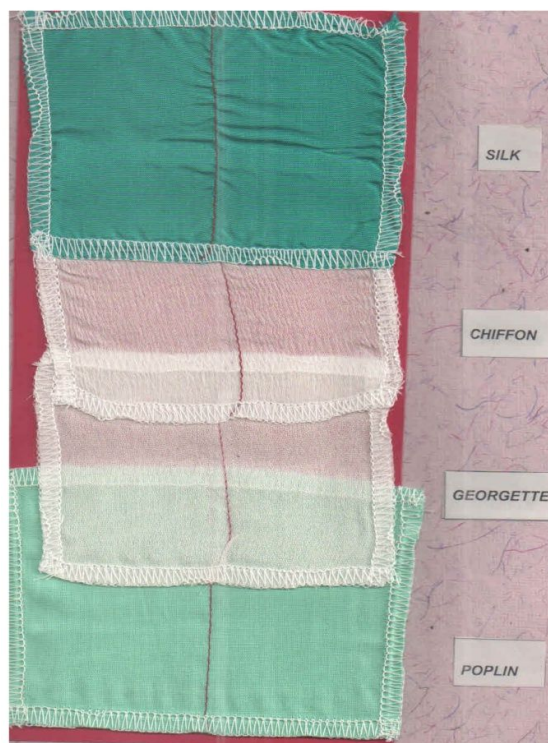
Various types of fabrics such as cotton (poplin – 40's), silk, chiffon, and georgette were chosen along with a three-ply polyester filament sewing thread. Samples were sewn using 2 layers of fabric on single needle lock stitch sewing machine (301stitch) considering above mentioned factors. Results of the samples are shown below (Plate 1 – 11).



**Plate 1: Cause of Seam Puckering Due to Lower Thread Tension**



**Plate 2: Cause of Seam Puckering Due to Upper Thread Tension**



**Plate 3: Cause of Seam Puckering Due To Pressure Foot Pressure**





**Plate 4: Cause of Seam Puckering Due to Stitch Length**



**Plate 5: Cause of Seam Puckering due to Thick Sewing Thread**

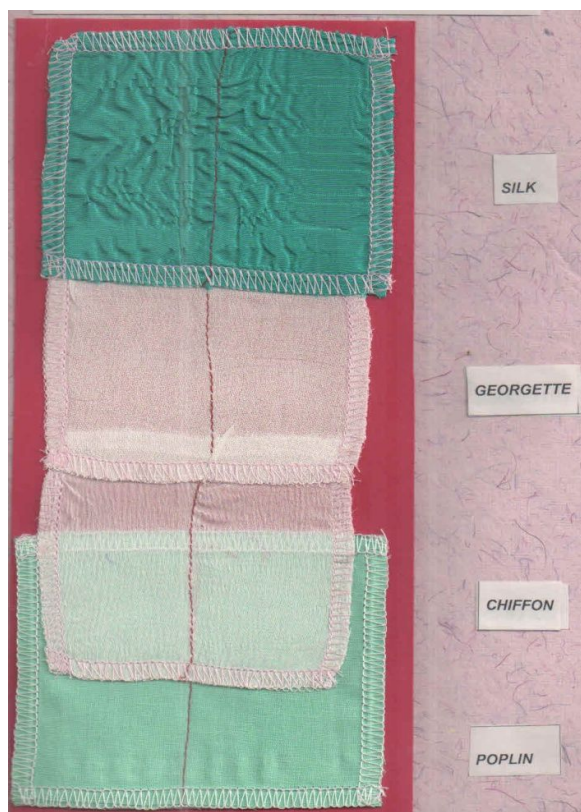


Plate 6: Cause of seam puckering due to Damage Needle

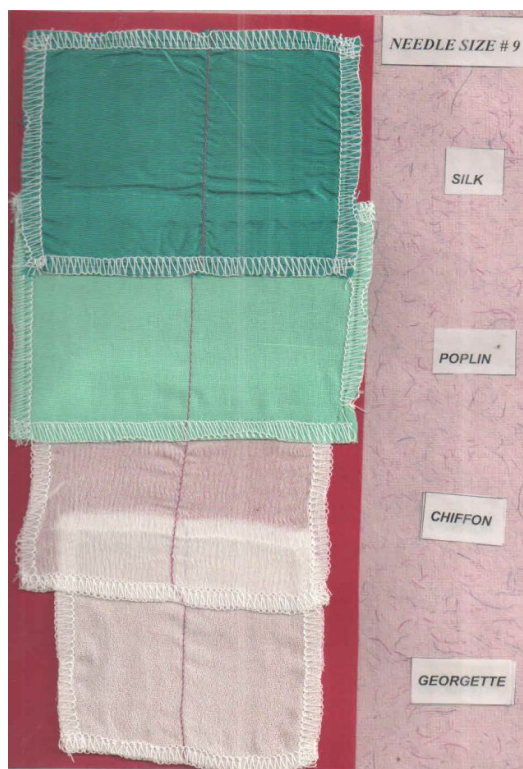
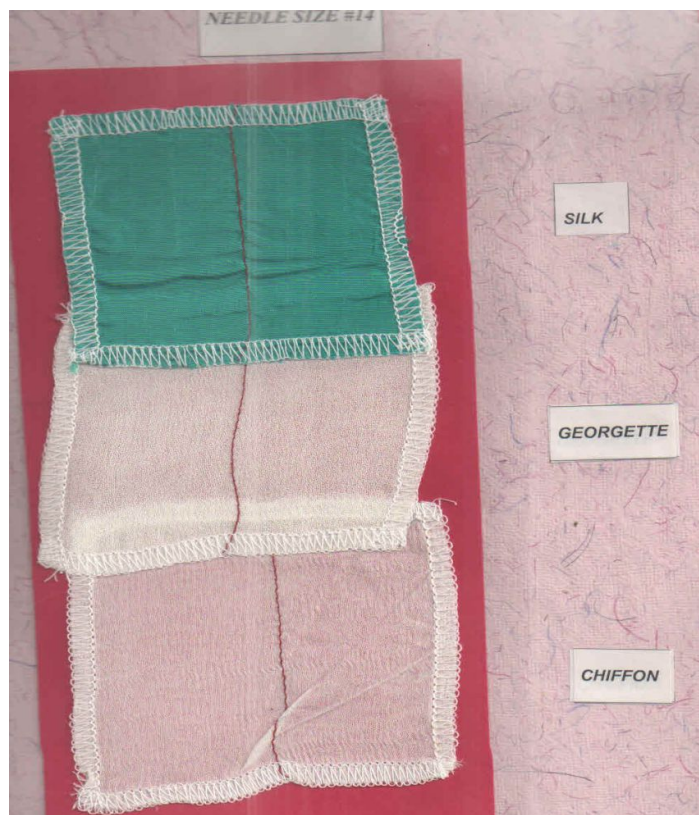


Plate 7: Cause of Seam Puckering Due to Wrong Needle Size





**Plate 8: Cause of seam puckering due to Wrong Needle Size**



**Plate 9: Cause of seam puckering due to Wrong Needle Size**



Plate 10: Cause of Seam Puckering due to Wrong Needle Size



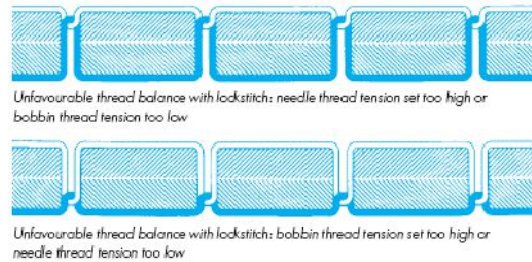
Plate 11: Cause of Seam Puckering due to Operator Negligence

## Prevention of Seam Puckering

### Thread Tension

If a thread is sewn into the seam with excessive machine thread tension, the thread will try to recover or return to its original length. This will cause the seam to pucker immediately as the seam comes out from under the presser-foot. Excessive thread tension during sewing will not only cause puckered seams but also cause other sewing problems including thread breakage and skipped stitches (A&E, 2010). Properly maintaining under thread and needle thread keep relaxation pucker away. In a lockstitch machine, the bobbin thread tension should be considered as a basis for the thread tension setting. While using finer sewing threads, the thread tension should be set as low as 20cN. The needle thread tension should be set approx. 2 to 3 times higher to that of the bobbin thread. Basic thing is that needle thread and bobbin thread tension must ensure that their interlocking take place in the middle of fabric. Maintaining proper tension during winding of sewing thread on to the bobbin helps in minimizing relaxation pucker. It is to be ensured that bobbin is evenly filled and thread is freely withdrawn for trouble free sewing. Uneven and carelessly wound bobbins provide uneven under thread tension, which ultimately causes relaxation pucker (Rao, 2006). For sewing fine fabrics, you can use the following thread tension values for a rough calculation:

- Lockstitch machines, high-speed sewing machine, 2-ply sewing
- Needle thread < 70 cN
- Bobbin thread adapted, (< 30 cN) (Aman Group, n.d)



Source: (Aman Group, n.d)

Figure 1



Source : (A &E, 2010)

Figure 2



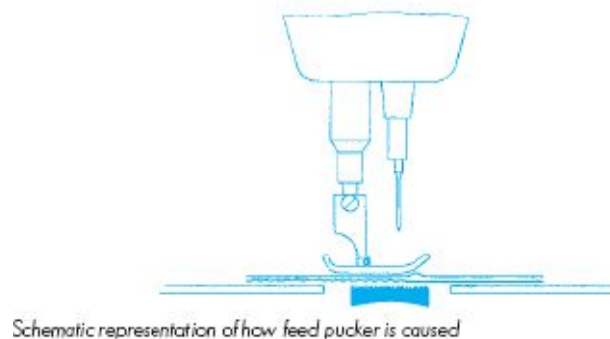
### Pressure Foot Pressure

Correctly adjusting pressure foot pressure minimizes the risk of transportation pucker (Rao, 2006). Use the minimum presser foot pressure that will maintain uniform feeding. Make sure the presser foot is clamping the fabric properly both in front and back of the needle. When the feed is up and moving the fabric, the seam should be clamped by the entire bottom surface of the presser foot. This can be checked by inserting a piece of paper under the foot from different angles and observing if the foot is clamping the fabric properly (A & E, 2010).

### Feed Dog Setting

Proper feed dog setting helps in minimizing transportation pucker.

- The height of feed dog is to be adjusted according to the type of fabric and its weight.
- Deep pile fabric requires feed dog to stand high to ensure proper feeding of fabric.
- Light weight smooth fabric requires feed dog to stand low so that pressure on pressure foot can be reduced to minimize the risk of transportation pucker (Rao, 2006).



Source: (Aman Group, n.d)

Figure 3

To reduce the feed pucker use the floating presser foot. With this system, only the sewing foot itself – and not the entire presser foot system – has to be moved together with the feed dog lift. This makes it possible to work with a much lower pressure. This method also allows much higher sewing speeds, because of the much lower inertia of the moving parts (Aman Group, n.d).

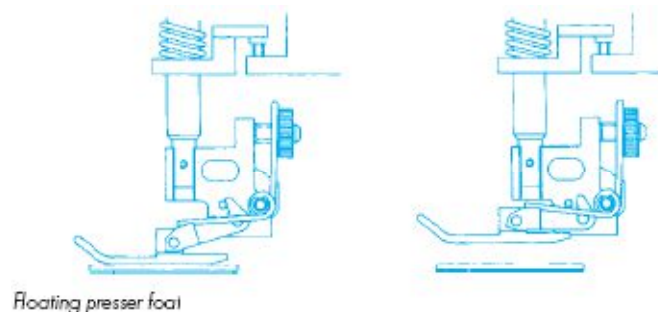


Figure 4

- **Throat Plate**

Proper setting of throat plate helps in minimizing the transportation pucker and damage to the fabric (Rao, 2006).

- **Stitch Length**

Maintaining optimum stitch length helps in minimizing the risk of relaxation as well as displacement puckers. It is observed that excessive stitch length is also one of the reasons for relaxation pucker. When low stitches/inch (SPI) i.e. more stitch length is set, there is excessive tension around the stitch holes (Rao, 2006).

- **Fabric Thickness**

The thickness of fabric directly influences the sewing thread storage in the seam and consequently the ability of sewing thread to adapt to the fabric. More thread storage in seam offers better elastic charactertic to the seam, which ultimately helps in reducing the relaxation pucker(Rao, 2006).

- **Thread and Needle Size**

Thread and needle size should be according to the type of fabric used. If the needle point is damage, may cause the seam puckering (Rao, 2006).

- **Thread Shrinkage**

A sewing thread should possess the same shrinkage property as the fabric into which it is stitched. If the sewing thread used is dimensionally unstable in washing or wetting or permanent pressing or hot box laundering, then the seam pucker may be visible due to sewing thread shrinkage. This problem mainly arises when cotton thread is used.

To avoid this type of defect, it is better to use spun polyester threads which are dimensionally stable in washing, wetting and at temperature up to 150°C. Cotton thread with special finishes may also be used. If cotton threads are required to use, a slight looseness of stitches is necessary to compensate for thread shrinkage when wet (Abu Sayad, n.d.)

### **Mismatched Patterns**

- Seam puckering will create when two different size patterns are sewn together.
- The designer is responsible for this. But can be occurred due to wrong selection of patterns(Islam, n.d).

### **Operator Negligence**

Casualness of operator restricts the fabric from flowing smoothly through the machine and by such unnecessary restricted movement, results in puckering. Operator must be able to control all the work elements related to his job. This include positioning of the fabric, guiding the fabric, accelerating the machine, extracting the fabricetc (Rao, 2006).

## **CONCLUSIONS**

Above discussion highlighted that there are many factors that influence the seam quality and causes seam puckering. There are various types of seam puckering like feed pucker, tension pucker and yarn displacement pucker. Factors may include needle thread tension, bobbin thread tension, incorrect use of thread and needle size, feeding of the fabric, stitch density, operator negligence etc. Therefore, it required to use correct needle size, thread, tension etc. to maintain the quality of the seam.

**REFERENCES**

1. A & E, 2010, *Minimizing Seam Puckering*, Retrieved October 11, 2016, from <http://www.amefird.com/wp-content/uploads/2010/01/Minimizing-Seam-Puckering-2-5-10.pdf>
2. Islam, M., n.d, *Different Causes of Seam Puckering*, Retrieved October 11, 2016, from <http://www.garmentsmerchandising.com/different-causes-of-seam-puckering/>
3. Aman group, n.d, *Prevention of seam pucker, , services and Technik*. Retrieved October 11, 2016, from [http://www.amannusa.com/pdf/nahtkraeuslen\\_gb.pdf](http://www.amannusa.com/pdf/nahtkraeuslen_gb.pdf)
4. Rao J.V., 2006, *Seam Pucker*, Northern India Textile Research Association.
5. Sayad, A., n.d, *what is Seam Pucker? Types of Seam pucker causes with remedies*. Retrieved October 11, 2016, from <https://textileapex.blogspot.in/2014/09/seam-pucker.html>



